

COMMENTS ON SURFACE WATER INTERIM MEASURES/INTERIM REMEDIAL
ACTION PLAN/ENVIRONMENTAL ASSESSMENT AND DECISION DOCUMENT

903 PAD, MOUND AND EAST TRENCH AREAS; OPERABLE UNIT NO. 2
12 JUNE 1990

General. The draft document must be updated to reflect appropriate provisions of the IAG (upon effective date) including but not limited to schedules, ARAR's, community relations, and field safety/operating procedures.

The nature of the plutonium identified in surface waters (dissolved, colloidal, suspended) is reportedly the subject of ongoing studies within DOE. The results of such investigations have direct bearing on the design of interim measures for OU 2, and the future success or failure thereof. These studies are not specifically described or referenced, yet broad conclusions are made as to the nature and extent of plutonium contamination present and the appropriate response. The studies and investigations used to support these conclusions must be specifically cited with pertinent information presented within the IM/IRA or made available for technical review before the validity of their application in this context can be ascertained.

The function of this action within the overall RI/FS effort for OU 2 and RFP, as defined by the IAG, should be clearly presented and reiterated at appropriate points to explain, for example, that the investigation does not extend to areas farther downstream in the drainages as they are being studied separately under OU 5 (Woman Creek), and OU 6 (Walnut Creek).

Section 1.1, Page 1-2. The last paragraph of this section indicates that bench testing is underway and mobile field treatment facilities will be installed and operated to test several treatment processes using water from an OU 2 seep. As this is the only section this action is mentioned, the role of this activity within the IM/IRA is not clear; particularly since it includes possible field testing of ion exchange, which is subsequently eliminated from consideration for use at OU 2 (See Section 5.2). The field treatability testing, if it is to be conducted as part of the IM/IRA for OU 2, must be completely integrated into the process and into this document. This must include a presentation of the schedule, extent, and objectives of such testing; a description of how the results obtained will be used to optimize the process design or operation of the IM/IRA treatment system; and a discussion of where this effort fits within the areawide treatability study scheduled for completion under the IAG.

Section 2.2.2.1. Check the use of the word "uncomfortably".

Sections 2.2.2 and 2.2.3. The generalized descriptions presented here should be updated and made as site-specific as possible based on ongoing boring/trenching programs, and related to subsequent conclusions on the movement and interaction of surface and groundwater within OU 2.

The lengthy descriptions of the drainages and pond systems are not necessary or appropriate here, except as related directly to the seeps.

Section 2.2.3.2. The statement that the ground water in surficial materials is hydraulically connected to Arapahoe formation waters should be qualified to indicate this is true only for shallower portions of the Arapahoe formation.

The strong downward vertical gradient observed between groundwater in surficial units and that in bedrock cannot be interpreted as indicative of a high conductivity contrast between the sandstones and claystones, as these are both bedrock units.

The average ground water velocity of 145 ft/yr cited for the Woman Creek Alluvium is significantly lower than estimates provided previously. The source of this value and an explanation of this discrepancy must be provided.

Sections 2.2.4 - 2.2.7. These discussions are not required as part of the IM/IRA plan.

Section 2.3. This section could be improved by replacing much of the text listing values and locations with a brief, simplified table for each media, similar to Table 2-1 for Unconfined Groundwater. The text should be reserved for interpretation of what the values mean to the IM/IRA effort, and identification of sources when possible, both of which are notably absent in the existing version. This must include a better evaluation of the significance of observed contamination with organics such as vinyl chloride, methylene chloride, and acetone, which are not amenable to treatment by the recommended process (see section 4.4.3.1).

Section 2.3.1. Currently available results of sampling completed subsequent to the December, 1989 background report should be incorporated into the interpretation of inorganic contamination within OU 2.

Section 2.3.2. The most recent data should be incorporated into the groundwater characterization during document revisions.

Section 2.3.2.2. Statements made within the IM/IRA Plan

regarding the comparison of quarterly field data to "background" data from a quarter other than that for which the field data is representative must be explicitly referenced as a qualitative comparison.

Section 2.3.3.1. The IM/IRA Plan must use background information appropriately. There is no significance to the fact that a field generated data point is less than two times the background upper tolerance limit.

The information generated during the Phase I RFI/RI for OU 2 does not provide the information needed to verify that the radioactive contamination is limited to surficial soils.

Section 2.3.3.2. There is inadequate information to demonstrate that organic contamination at SWMUs 108 and 158 does not exist.

Section 2.3.3.3. The last paragraph on page 2-33 refers to VOC contamination due to a release from Trench T-2. It seems that this paragraph must be misplaced and does not belong in this section.

Section 2.3.4.1. SED-1, SED-2, SW-1 and SW-2 locations should be presented on figure 2-9.

Section 2.3.4.3. The IM/IRA Plan must explain why there is no data for SED-12 or SED-13 and why there is no radioactivity data for SED-11. Related to this problem, DOE must ensure that sufficient samples are collected to perform radiochemical analyses and that these analyses are requested (refer to Appendix A-5).

Section 2.3.5. The first paragraph of this section says that total radiochemical and metals data are not discussed. This appears to be untrue based on subsequent paragraphs. The "assessment methodology that accounts for varying concentrations of suspended solids" should be presented if it is relevant to selection of the IM/IRA, or the significance of it should be clarified.

Surface water monitoring stations that represents seeps to be collected under this IM/IRA should continue to be sampled individually and not in aggregate.

The sentence beginning with "Low and very infrequent..." in the first paragraph on page 2-38 appears to be incomplete.

Section 2.3.5.3. The data Table 3.3 shows dissolved plutonium above ARAR, and the interpretation concludes that the plutonium is particulate, from surface soils washing into the seeps. Ground water well 15-87 has been found to be

contaminated with radionuclides. Appendix A-5 presents data indicating dissolved radionuclides above ARAR for the 903 Pad and Lip Site. Explanation of the discrepancy is required. The conclusion regarding plutonium and americium as particulates is not substantiated. The first paragraph of page 2-41 appears to be misplaced and should not be within this section.

Section 2.3.7. This section is supposed to summarize the contamination. A summary of how the observed data impacts the selection of an IM/IRA is appropriate, and badly needed, at this point. Instead, this section presents several unsubstantiated theories related to natural occurrence and/or evaporative concentration as explanations for values acknowledged elsewhere to represent contamination. This discussion is at best tangential to the question at hand and should be deleted in favor of an evaluation that provides the inputs required for subsequent decisions.

The purpose of presenting the evaporative loss theory is unclear. There is little known about waste source constituents. Until the results of the Phase II source characterization are available, the evaporative loss theory cannot be verified. Exhibition of gradients may also be due to poor source characterization. Well 29-87 could be impacted by many upgradient sources distinct from OU 2. Updated information from the Background Study should be presented to verify conclusions drawn. Conclusions regarding U234/U238 ratios are questionable given the precision of the data.

Section 2.5. There is no immediate threat. There is an imminent threat posed by contaminants at OU 2.

Section 3.0, General. If DOE is recommending a waiver of ARARs for inorganic and/or metal constituents for this IM/IRA, then this position should be reflected explicitly within the ultimate objectives stated within section 3.0, possibly as a summary section at the end of this section.

Section 3.2. The schedule should be updated to be consistent with the revised IAG, actual submittal dates and should also be consistent with the written guarantees made by DOE regarding operation of the IM/IRA for OU 2.

Section 3.3. Please reference our comments on the Final Phase II RFI/RIFS Workplan (alluvial) for OU 2. Note the 14 May 1990 transmittal letter paragraph which states, in part, "Of significant importance within the comments are concerns regarding the new National Contingency Plan's (NCP) affect on the proposed ARAR analysis...This concern impacts all RFI/RI work at all OUs for Rocky Flats and should be taken

into consideration while developing workplans and performing the work." The new NCP provisions and the specific comments made on Section 2.4 of the conditionally approved Phase II OU 2 Work Plan must be properly incorporated in the ARAR analysis presented in the IM/IRA plan.

The revised discussion of ARARs should be condensed to cover those items relevant to the decision process, and only those items. A brief table similar to Table 4-1 could better present the pertinent information in Tables 3-3 and 3-5, which could be appended in their updated form.

Section 3.3.1.3. The surface water quality standards referenced here do not appear to be included in the screening of probable ARARs presented in Table 3-5.

Section 3.3.1.5. This section argues that radionuclide contamination is evident and should be treated to meet ARARs (item 2, page 3-25); and that uranium concentrations are due to evaporative concentration and "treatment for...removal would be a futile and costly attempt at cleaning up the natural environment." A consistent position on the uranium contamination and the required response must be provided.

Item 3c in the page 3-25 listing indicates influent metals will be below ARAR due to mixing. Dilution is not considered and acceptable treatment process, and NPDES compliance is not the only standard by which the IM/IRA performance objectives are set.

Reasoning such as "it is prudent..., it is not probable..., and "it is also hypothesized..." does not constitute a basis for decision making without documentation adequate to support associated conclusions. Documentation must include references, assumptions, and calculations used in arriving at the position stated. When necessary, decisions based on professional judgement must be presented as such and will be open to challenge by other parties.

The designation of SW-61 as the confluence of SW-60 and SW-59 is inconsistent with the field observations made by EPA and CDH. It is EPA understanding that SW-61 marked the flow within the concrete pipe north of SW-60. DOE must verify the location of SW-61 and reevaluate the design basis for the IM/IRA, accordingly. During a meeting held on March 13, 1990, DOE committed to separately collecting the seep water flowing from SW-59 from the waters flowing from SW-60 and SW-61. Thus design basis shall be base flow from SW-60 and SW-61 and the entire flow from SW-59. Two collection systems must be installed to provide for this.

Outlier determinations cannot be made to invalidate VOC

analyses. The IM/IRA document must be clarified within this section to indicate that the determination of outliers, for other than VOC analyses is for the sole purpose of estimating treatment plant influent concentrations.

The estimated influent quality regarding metals cannot be compared to ARAR. Dilution is not an acceptable form of treatment and cannot be used as justification for waiver of ARAR. It is also inappropriate to propose the unsubstantiated evaporative concentration theory as justification of waiver of ARAR.

Table 3-4. The use made of this information in setting process design parameters is not clear. Manipulations of the data set which impact the decision process must be fully explained and justified.

Table 3-5. The information presented here must be updated in accordance with comments presented above on Section 3.3. Also, it should be noted in the comments that the parties have not reached agreement on the applicability of NEPA to RCRA/CERCLA actions.

Section 4.0. Effectiveness and implementability evaluations must recognize the dangers associated with surficial radionuclide contamination, particularly the resuspension potential. Construction procedures must incorporate the handling, characterization, and disposal requirements for excavated material established for use in the 881 Hillside IM/IRA, and the applicable RCRA LDRs.

Section 4.1. The alternatives analysis does not include any examination of alternatives for disposal of the treated water. Alternatives which would eliminate further discharges to the surface drainages must be evaluated as part of an overall strategy to reduce or eliminate potentially contaminated inflows to downstream drinking water supplies, in accordance with the RFP Water Management Plan.

Section 4.1.1. The argument presented for not considering groundwater withdrawal is unconvincing. A withdrawal system is being installed at the 881 Hillside sites.

The selection process for surface water collection points does not appear to have included any evaluation of several drainages running southeast from the East Trenches area. Contamination potential in these drainages appears significant based on site history and the June 1988 aerial photograph indicating construction activity possibly involving installation of a ditch directing flows from surface seeps in this area to pond C-2. Justification for excluding these areas from the IM/IRA must be provided.

Section 4.1.2. The process used to select the candidate treatment processes must be more clearly documented. Many other process options are available, from which a handful were picked. This step must be explained, at least to the point where the reader can understand why Ion Exchange was selected for study in preference to other available technologies, even though it apparently cannot meet the stated objectives for plutonium removal. The final paragraph of the section attempts to address this question, but covers only suspended solids/inorganics removal, and offers only a number of unsupported conclusions. For example, some basis must be provided for the statement that reverse osmosis and membrane filtration are not cost effective in this application. Cost effectiveness alone does not provide justification for elimination of an alternative.

The fourth paragraph on page 4-5 states that "Fabric filtration may be used to remove 1 micrometer and smaller size particulates...". This statement is probably meant to state that it would be capable of removing 1 micrometer and larger particles.

Section 4.2. Update this discussion to show the screening criteria as described in the current NCP and associated guidance documents. A full evaluation of alternatives using these criteria will incorporate an assessment of potential impacts to human health and the environment, and eliminate the need for a separate treatment of these issues.

Section 4.2.1. Effectiveness criteria include reduction of toxicity, mobility and volume through treatment.

Section 4.3. This section evaluates collection points, not collection techniques as stated. If flow can be measured at SW-103, then the flow should be collected at SW-103, not near B-5. Alternatives should be presented for collection of the seeps. Alternatives might be amenable to collection of water from the SW-103 seep if the sumps are not effective in collecting such an areally extensive seep.

Section 4.3.1.1. CS-53 is not included in the listing of surface water collection points, either here or in Section 6.1.1, yet it is shown on Figure 4-2.

A sensitivity analysis should be performed to evaluate the cost impact against the increased protectiveness offered by altering the collection system to minimize the need for bypassing during high flows, when the flux of some target contaminants could be the highest.

Section 4.3.2.3. The point of this discussion is completely

obscured by circular logic. The section should be clarified.

Section 4.3.2.4. The probability of selecting this option cannot be known before the screening process has started. Show the costs and let the comparative analysis support the choice.

Sections 4.4.1. and 4.4.2. Since the same treatment technologies will be applied to remove both the suspended solids and radionuclides, discussing them separately confuses the discussion and clouds the comparison.

The need for treatability studies is specifically mentioned as a negative factor as it relates to Ion Exchange. This is also a valid concern for advanced membrane filtration, and should be included as such in the comparative evaluation.

Section 4.4.1.2. Treatment effectiveness for plutonium cannot be certain, as the behavior of this contaminant in surface waters is not adequately characterized. If the DynaSand filter is effective, the effluent should not require downstream treatment for radionuclide removal.

Section 4.4.2.1. The document must explain the relevance of the discussion of plutonium chemistry and stability at pH different than that expected within the environment. It is unclear why it is expected that the plutonium hydroxide would dewater given the media to be treated. Explain how it is expected that when adsorption affinity decreases mobility in soil water environment decreases. Cesium 137 is not naturally occurring.

Section 4.4.3. Table 4-1 indicates treatment plant design will be based on the presence of methylene chloride and vinyl chloride at concentrations requiring treatment. Effectiveness is evaluated based on the presumption that these compounds present no concern. This discrepancy must be resolved, and a consistent, appropriate evaluation applied to treatment system effectiveness. Protectiveness demands the selected treatment system demonstrate adequate performance for all contaminants (and concentrations) reasonably anticipated based on historical data; it is not prudent to remove most high concentrations from the data set and then perform an analysis that "assumes" several known contaminants are not present.

Section 4.4.3.1. Upflow modes through GAC columns prevent short-circuiting through the column. Verification that the GAC is not a mixed waste must take place prior to shipment for regeneration. Only two of the VOC contaminants to be addressed through this IM/IRA are specified in the referenced Federal Register as treatable by GAC. Although

there is advantage to testing and utilizing a treatment process for VOCs that is different than that proposed for OU 1 IM/IRA, it is ineffective to select an alternative that is known from the start to be incapable of treating contaminants of concern within the seeps at OU 2.

Section 4.4.3.2. It should be explicitly stated which VOCs were bench scale tested for OU 1 IM/IRA so that a comparison to the VOCs present within the OU 2 media to be treated can be made.

Section 4.4.3.3. If GAC is ineffective for treatment of methylene chloride, vinyl chloride and acetone, then air stripping in series with a vapor phase carbon adsorption process will result in media transfer of these constituents, not treatment.

Section 5.2. The discussion of technologies for suspended solids/radionuclide removal is confusing and internally contradictory. If ion exchange won't work because the plutonium is colloidal, then why does dissolved plutonium exceed ARAR? Will uranium meet ARARs, or only to the extent practical because it is all natural? The weaknesses of the analysis undermine the conclusions presented here, which must be rewritten with appropriate support in earlier sections.

The final paragraph of this section indicates the selection of the IM/IRA treatment process was actually based on a desire to try something other than the system chosen for the 881 Hillside, rather than on the foregoing analysis. While it is true that development of a treatment performance data base is an important objective of the overall RFP program, Areawide Treatability Studies are included in the program for that purpose. That is not a valid basis for proceeding with an IM/IRA which ignores documented evidence of contamination and thus may not adequately address the potential threats to human health and the environment present at OU 2.

Table 5-1. Flow variability does not significantly limit UV/Peroxide implementability. Proper process design and system operation can accommodate flow changes. The effect of this requirement will be accounted for in the analysis as an additional cost item.

Section 6.4. The use of an "existing unit" at RFP for advanced membrane filtration treatability testing has not been previously mentioned. The details of this effort, its role in the IM/IRA, and its integration into the areawide studies must be specified.

Sections 7 and 8. These sections are not necessary or appropriate as part of an IM/IRA plan and should be removed. Environmental impacts can be appropriately addressed within the alternative selection process.